REMARKS

The Office Action of June 9, 2009, has been carefully studied. Claims 17, 19-21, 31 and 32 currently appear in this application. These claims define novel and unobvious subject matter under Sections 102 and 103 of 35 U.S.C., and therefore should be allowed. Applicant respectfully requests favorable reconsideration and formal allowance of the claims.

Claim Amendments

Claim 17 has been amended to incorporate the limitations of claim 18, namely, that the chemically modifying layer contains a carboxyl group.

Art Rejections

Claims 17-19, 31 and 32 are rejected under 35 U.S.C. 102(b) as being anticipated by Jordan et al., *Anal. Chem.*, 1997, **69**: 4939-4947.

This rejection is respectfully traversed.

There are two significant differences between Jordan et al. and the solid support claimed herein:

1. The electrostatic layer of Jordan is not a positively charged compound as claimed herein because the carboxyl group of MDA has already bonded to PL

[poly(L-lysine)] electrostatically and the carboxyl group of SSMCC has already bonded to PL.

In contrast thereto, the electrostatic layer in the presently claimed substrate is positively charged and includes a compound such as an amino group-containing compound, which can electrostatically attract nucleic acid molecules. It is also evident from the results in Example 1 at page 25, lines 14-16 (paragraph [0084]) that "the intensity of a fluorescence signal was not increased by using a covalent bond type substrate that hardly has an electrostatic layer."

2. As noted above, the carboxyl group in Jordan cannot bind to nucleic acid molecules because the nucleic acid molecules are already bonded to the other.

On the other hand, the carboxyl group in the presently claimed substrate is capable of covalently binding to a nucleic acid molecule into the substrate provided with the electrostatic layer, as described in the present specification at page 13, lines 14-23, paragraph [0046].

Claims 17, 19, 20 and 31 are rejected under 35 U.S.C. 102(a) and 102(e) as being anticipated by Iwaki et al., US 6,858,392.

This rejection is respectfully traversed.

It is respectfully submitted that Iwaki does not disclose a chemically modifying layer containing a carboxyl group in the electrostatic layer that makes it possible to introduce a functional group capable of covalently binding to a nucleic acid molecule, as recited in amended claim 17.

Claims 17 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jordan in view of Iwaki.

This rejection is respectfully traversed.

As noted above, Jordan does not disclose a positively charged electrostatic layer as claimed herein. Furthermore, the carboxyl group in Jordan cannot bind to nucleic acid molecules because they have already bonded to the other nucleic acid molecules. Iwaki adds nothing to Jordan, because Iwaki does not disclose a chemically modifying layer containing a carboxyl group on the electrostatic layer. Even combining Jordan and Iwaki, one would not obtain the herein claimed substrate which has a positively charged electrostatic layer and a chemically modifying layer containing a carboxyl group on the electrostatic layer.

Claims 17, 19 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jordan in view of Woo et al., US 5,929,194.

This rejection is respectfully traversed.

The Examiner alleges that Woo teaches polyarylamine compounds for coating substrates and forming films on the substrate carrying positive charges. However, it should be noted that the electrostatic layer in Jordan is not positively charged. Therefore, there would be no motivation to use the Woo polyarylamine on the Jordan substrate.

Claims 17 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Iwaki in view of Mao et al., US Published Application 2003/0124332.

This rejection is respectfully traversed.

As noted above, Iwaki does not disclose a chemically modifying layer containing a carboxyl group on the electrostatic layer. Mao discloses that carboxylic groups can be introduced into **porous** materials (paragraph [0104]). However, it should be noted that Mao discloses in paragraph [0017] that the materials can be used as films, lateral flow membranes, conjugate pads, extraction material and blood flow separation materials. It is not understood why one would incorporate a layer from Mao onto the detection device of Iwaki.

Claims 17, 19 and 21 are rejected under 36 U.S.C. 103(a) as being unpatentable over Iwaki in view of Woo.

This rejection is respectfully traversed.

Even though Iwaki discloses a variety of amino group containing compounds such as polylysine and silane, the Examiner concedes that Iwaki does not teach polyarylamines. Woo discloses crosslinkable polyarylamines which can be crosslinked or chain extended to form films. There is no such crosslinking or chain extension in the presently claimed substrate, because in the presently claimed substrate the amino group has an amino group at the terminus to which the substrate does not bind. This would not be the case with the crosslinked or chain extended polyarylamines disclosed in Woo.

Claims 17 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Iwaki in view of Bertrand, *Macroml. Rapid Commun,*, 2000 **21**:319-348.

This rejection is respectfully traversed.

As described above, Iwaki does not disclose a chemically modifying layer containing a carboxyl group on the electrostatic layer. Therefore, the fact that Bertrand teaches a solid support comprising an electrostatic layer wherein the thickness of he layer is from a few

Angstroms to micrometers is immaterial, as Bertrand does not teach anything that would add a modifying layer containing a carboxyl group to the Iwaki device..

Claims 17-20 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mao in view of Mirus et al., WO 01/02538.

This rejection is respectfully traversed.

The Examiner concedes that Mao never teaches actually binding a nucleic acid molecule to a substrate. The fact that Mirus teaches that nucleic acid molecules can be covalently bound to a substrate by functional groups on the substrate does not suggest that the Mao device could be bound to a nucleic acid molecule, as Mao discloses in paragraph [0017] that the materials can be used as films, lateral flow membranes, conjugate pads, extraction material and blood flow separation materials. None of these devices suggest a substrate to which a nucleic acid is bound.

Claims 17, 19 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mao in view of Mirus and further in view of Woo.

This rejection is respectfully traversed.

The Examiner admits that neither Mao nor Mirus teaches that the amino group containing compound can be polyarylamine. However, Woo adds nothing to this, because Woo discloses crosslinked or chain-

extended polyarylamines. These cannot be used in the herein claimed substrate, because the herein claimed substrate requires that the amino compound have an amino group at the terminus, which would not be the case with a crosslinked or chain-extended polyarylamine.

Claims 17 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mao in view of Mirus and further in view of Bertrand.

This rejection is respectfully traversed.

The Examiner concedes that Mao never teaches actually binding a nucleic acid molecule to a substrate. The fact that Mirus teaches that nucleic acid molecules can be covalently bound to a substrate by functional groups on the substrate does not suggest that the Mao device could be bound to a nucleic acid molecule, as Mao discloses in paragraph [0017] that the materials can be used as films, lateral flow membranes, conjugate pads, extraction material and blood flow separation materials. None of these devices suggest a substrate to which a nucleic acid is bound. Therefore, the disclosure of Bertrand that the electrostatic layer can be of a thickness of between 1 nm and 500 microns adds nothing to the combination of Mao and Mirus, because the combination of Mao and Mirus does not render obvious the herein claimed substrate.

In view of the above, it is respectfully submitted that the claims are now in condition for allowance, and favorable action thereon is earnestly solicited.

Respectfully submitted,

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